New Project

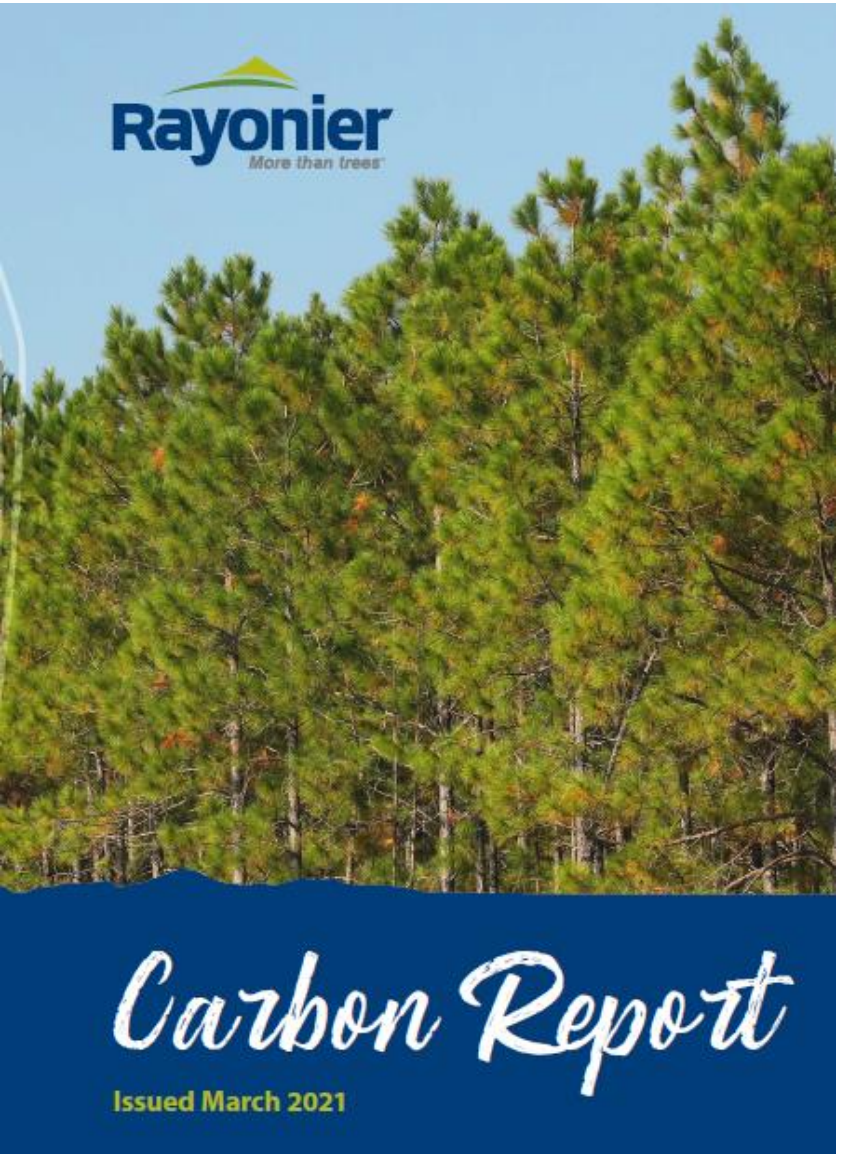
Quantifying carbon sequestration as a function of silvicultural treatment in loblolly pine

CAFS 21.87

Joe Dahlen (UGA), Cristian Montes (UGA), Bronson Bullock (UGA), Dan Markewitz (UGA), Tom Eberhardt (USFS)

Joe Dahlen

Growing interest in quantifying carbon in managed forests



Center for Advanced Forestry Systems

Research Question
How does silvicultural treatment influence carbon sequestration in stems?

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Contents lists available at ScienceDirect

Soil Biology & Biochemistry

journal homepage: www.elsevier.com/locate/soilbio

Twenty years of intensive fertilization and competing vegetation suppression in loblolly pine plantations: Impacts on soil C, N, and microbial biomass

Sami W. Rifai, Daniel Markewitz*, Bruce Borders

Warnell School of Forestry and Natural Resources, The University of Georgia, 180 East Green Street, Athens, GA 30602, USA

NSF

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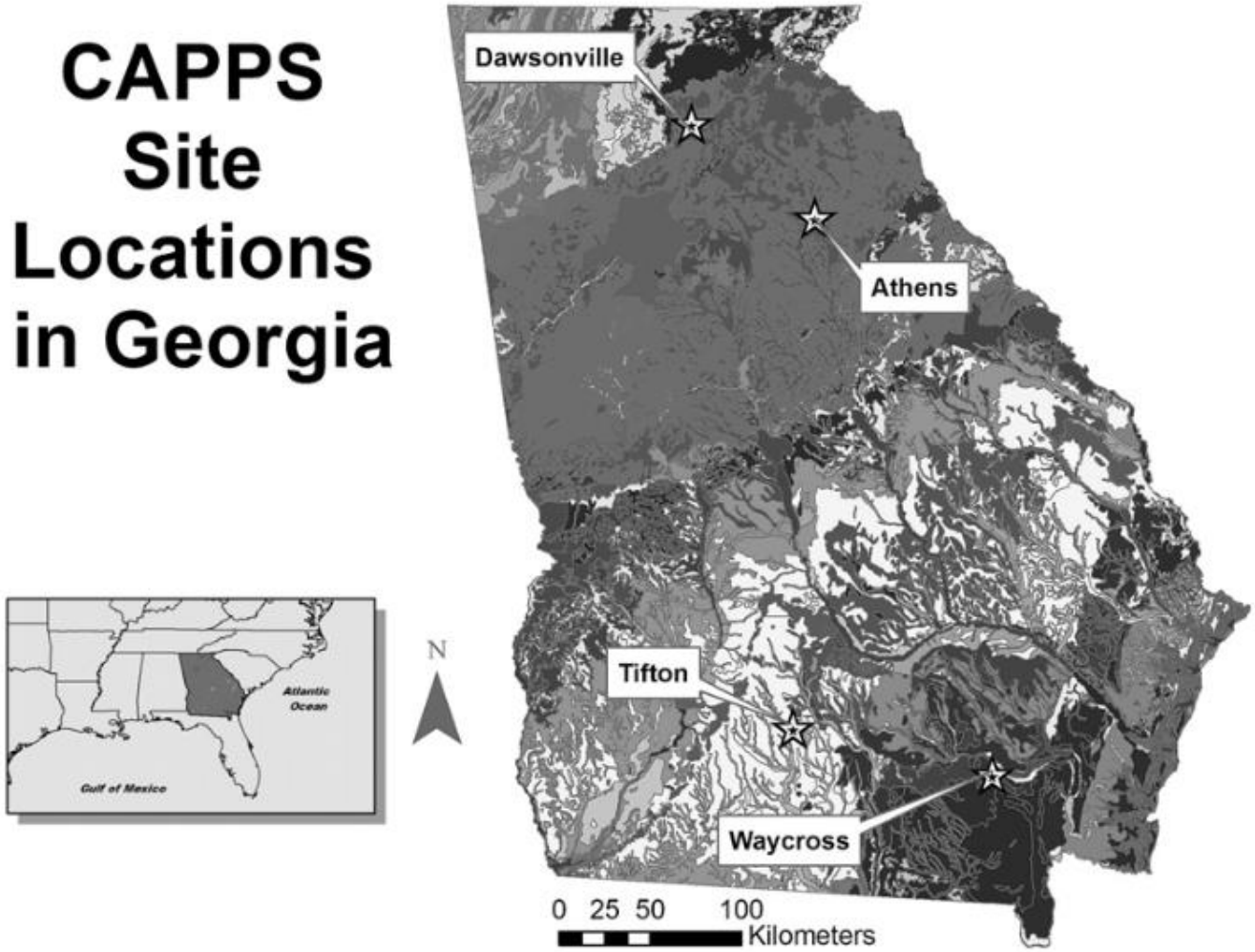
CAPPS study



Control (C)
Herbicide (H)
Fertilizer (F)
Herb + Fert

Rifai et al. 2010

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Treatments generally reduced microbial biomass

Mixed results on soil carbon

Fertilization increased soil carbon

Herbicide decreased soil carbon

Herb + Fert increased soil carbon

Dan Markewitz
USDA AFRI Grant
Leveraging PINEMAP, growing CAPPS – Soil health in managed forests

CAPPS study will be harvested and replanted

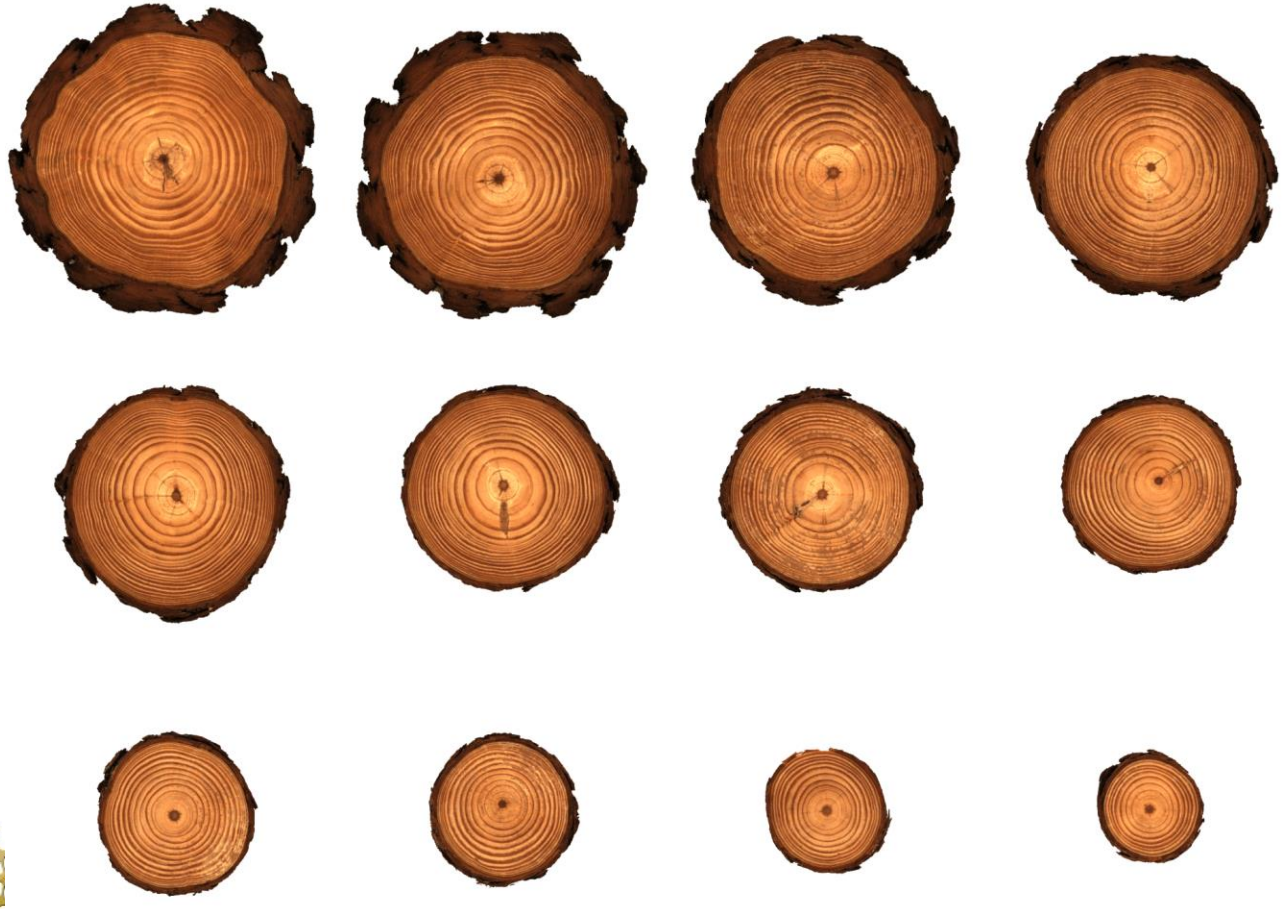
Opportunity to sample these trees before harvest

Emphasis on this study on the main bole

Volume * Specific Gravity = Dry Weight

Dry Weight & Carbon % = Carbon

Long term carbon vs short term carbon



Prior work shows treatment differences in both tree volume and wood specific gravity

Impact of vegetation control and annual fertilization on properties of loblolly pine wood at age 12

Alexander Clark III*
Bruce E. Borders
Richard F. Daniels

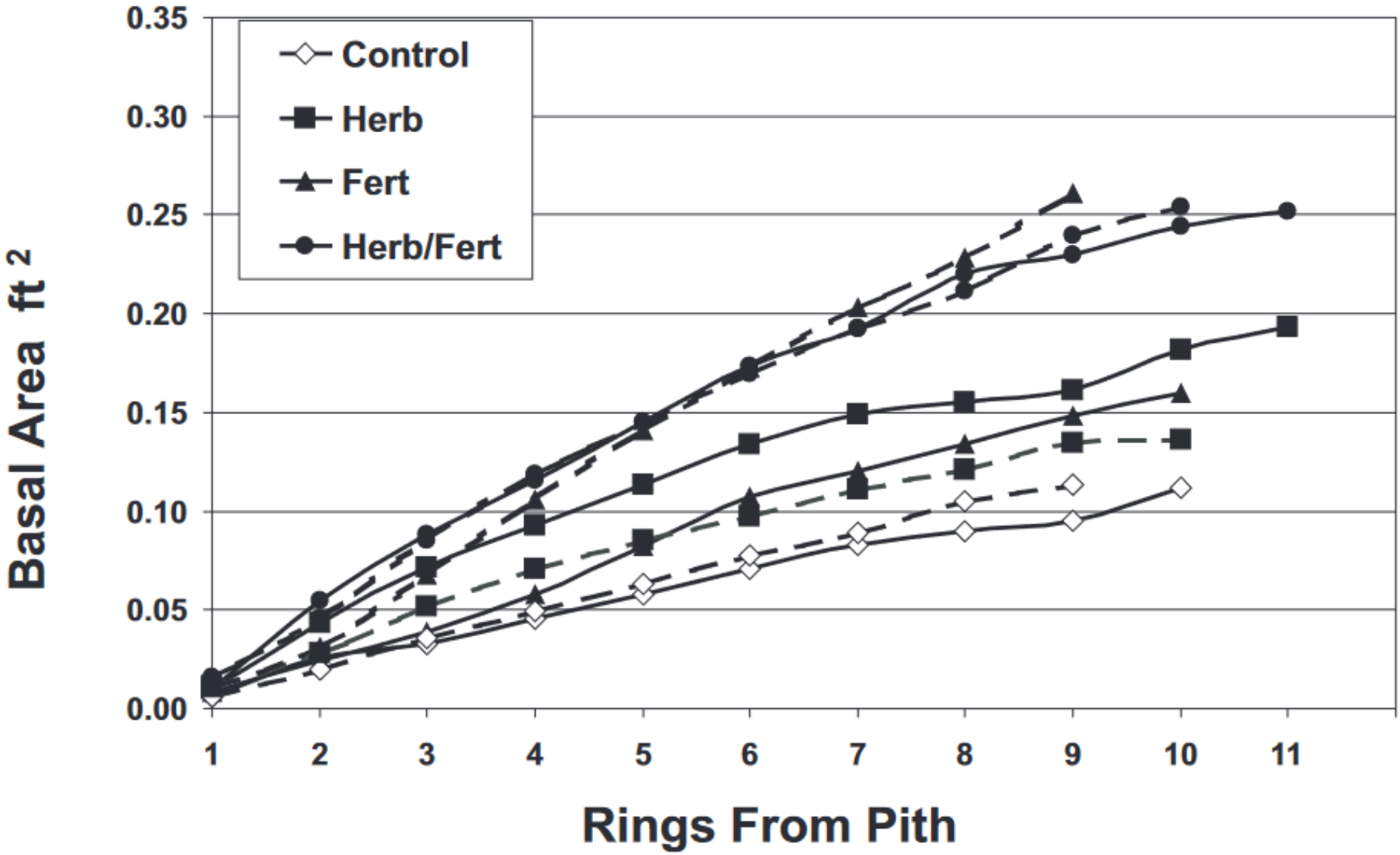


Figure 2. — Average cumulative basal area growth over rings from pith by treatment for 12-year-old loblolly pine sampled in the Piedmont (solid line) and Coastal Plain (dash line) regions.

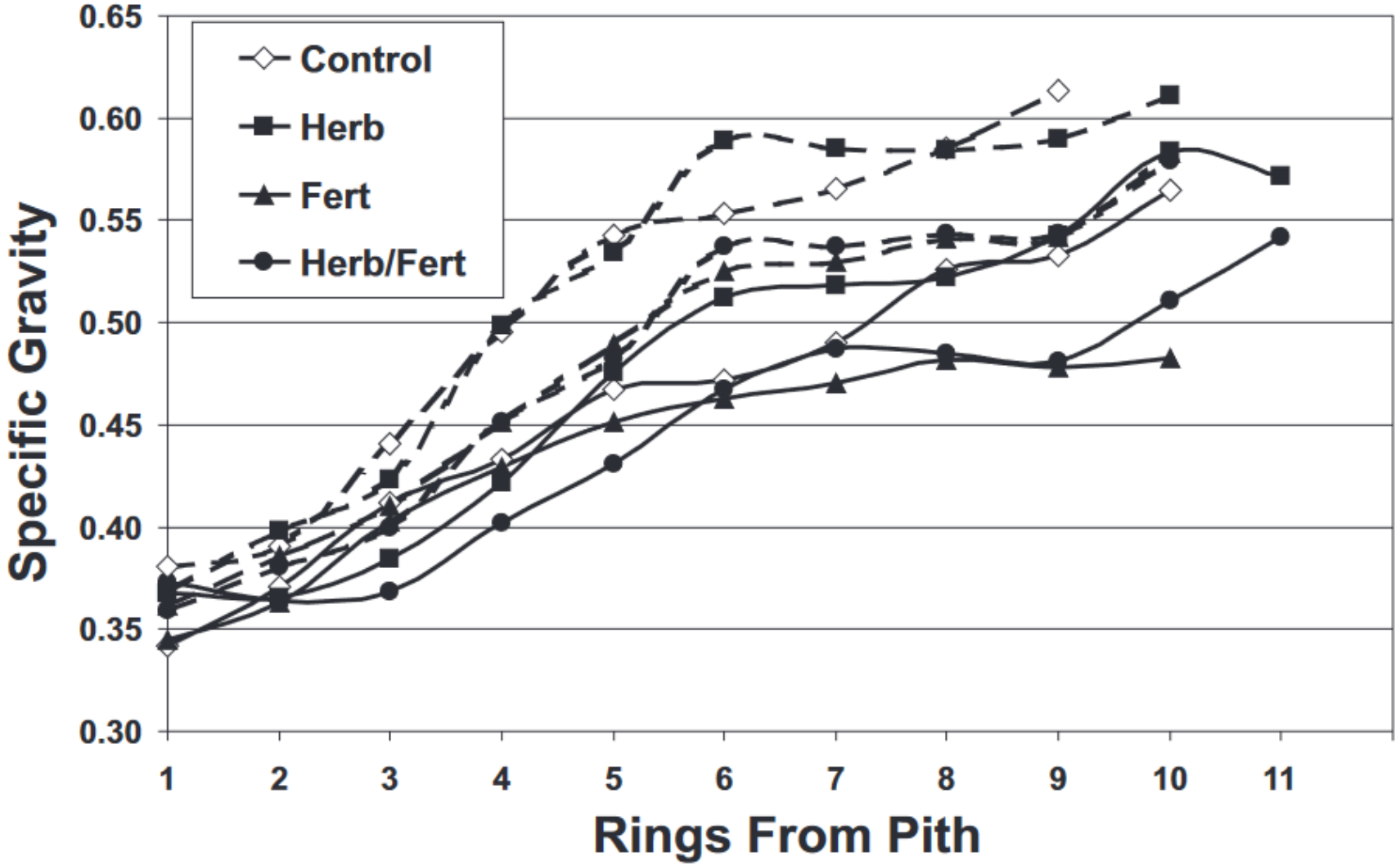
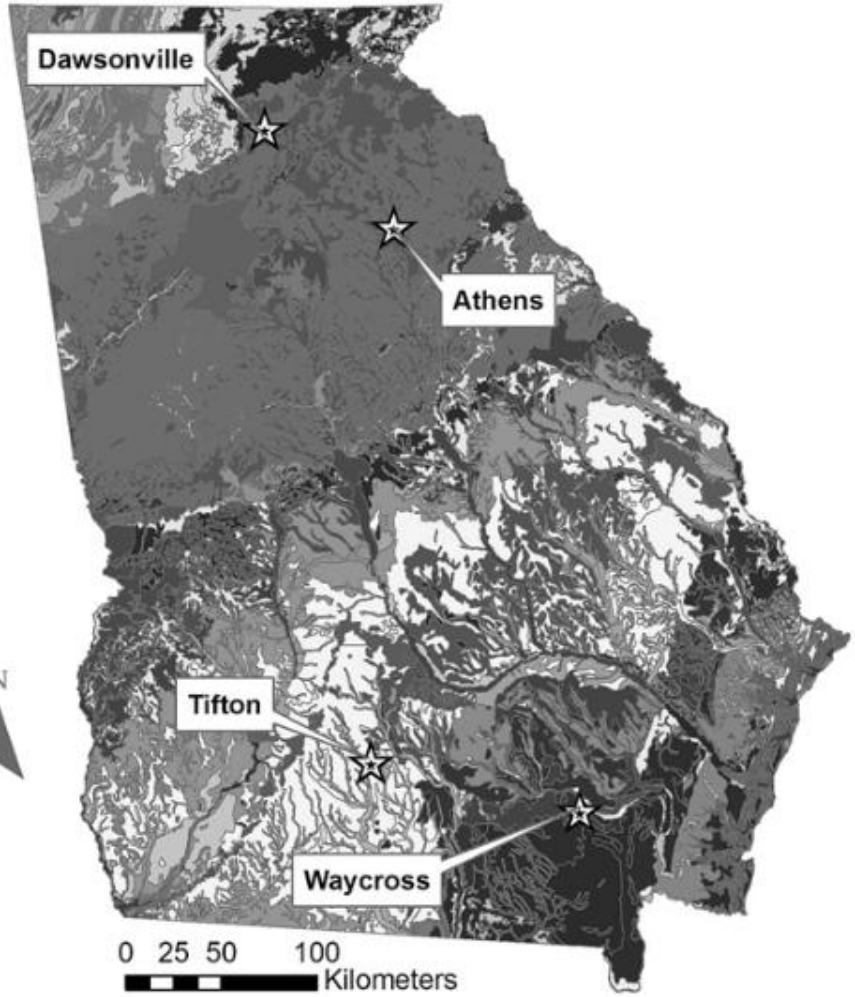


Figure 3.—Average ring SG over rings from pith by treatment for 12-year-old loblolly pine sampled in the Piedmont (solid line) and Coastal Plain (dash line) regions.

This study will generate a great dataset from 4 sites

CAPPS Site Locations in Georgia



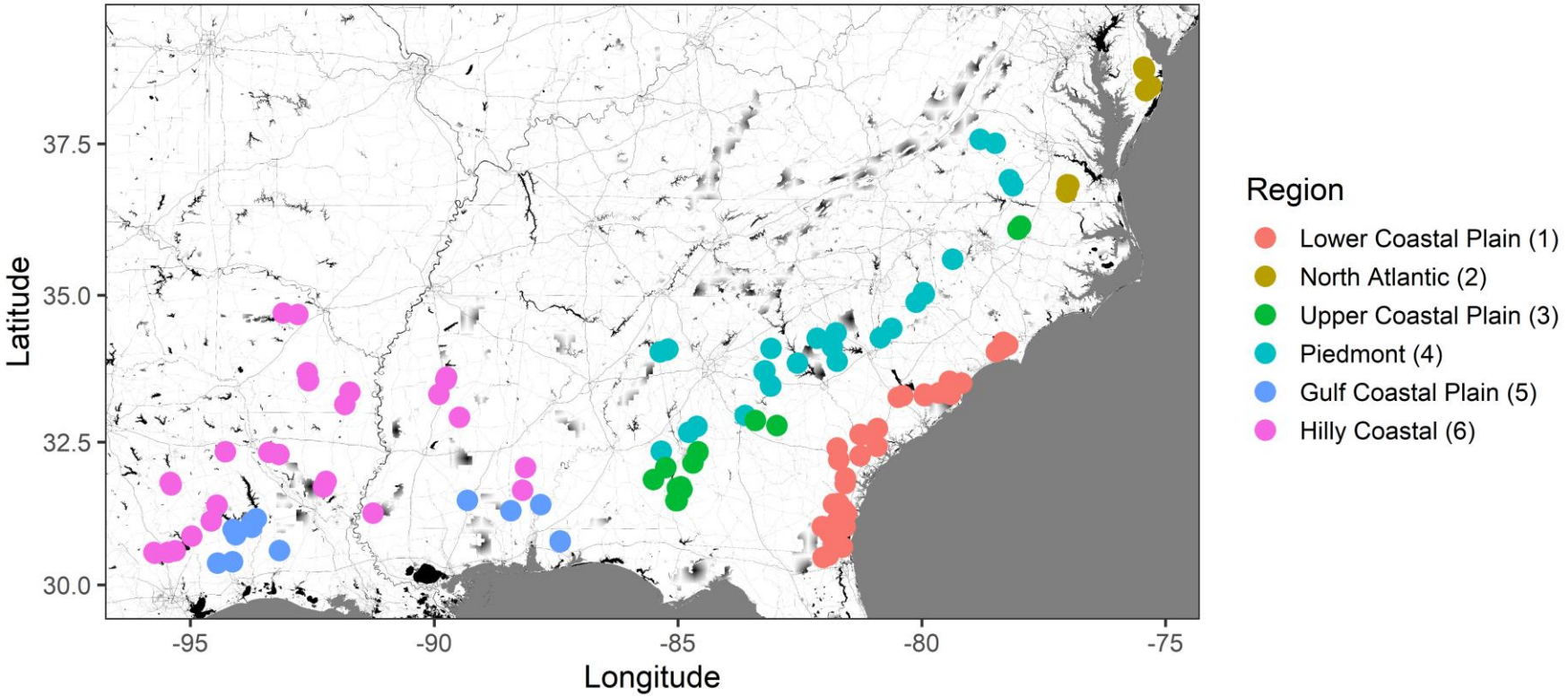
Control (C)
Herbicide (H)
Fertilizer (F)
Herb + Fert

Rifai et al. 2010

Variation in wood density across WQC baseline study (no intensive treatments)

Stand = 10%

Tree within stand = 13%



Reducing carbon uncertainty using Resi-Drill

Picture courtesy of Geoff Downes
Forest Quality

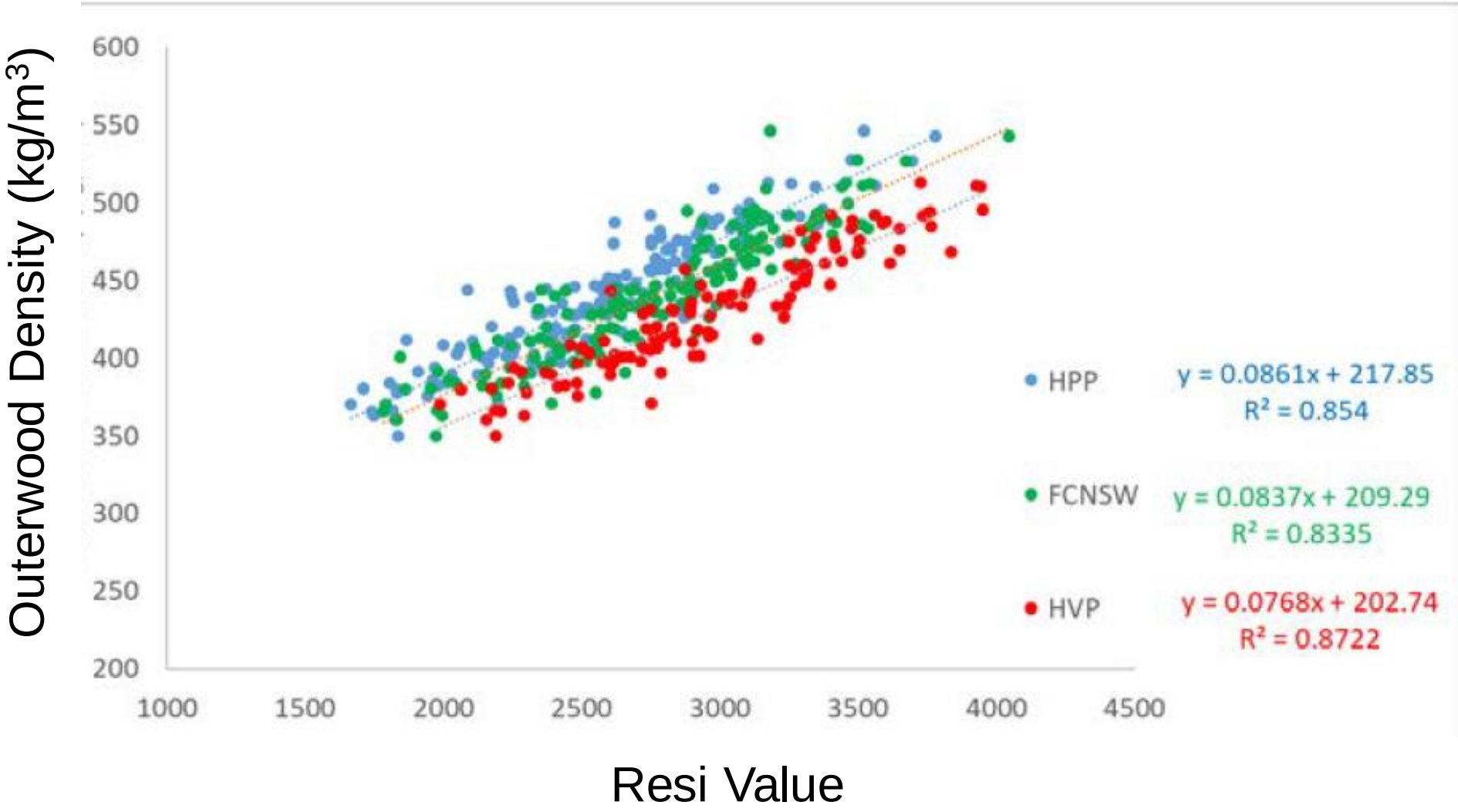
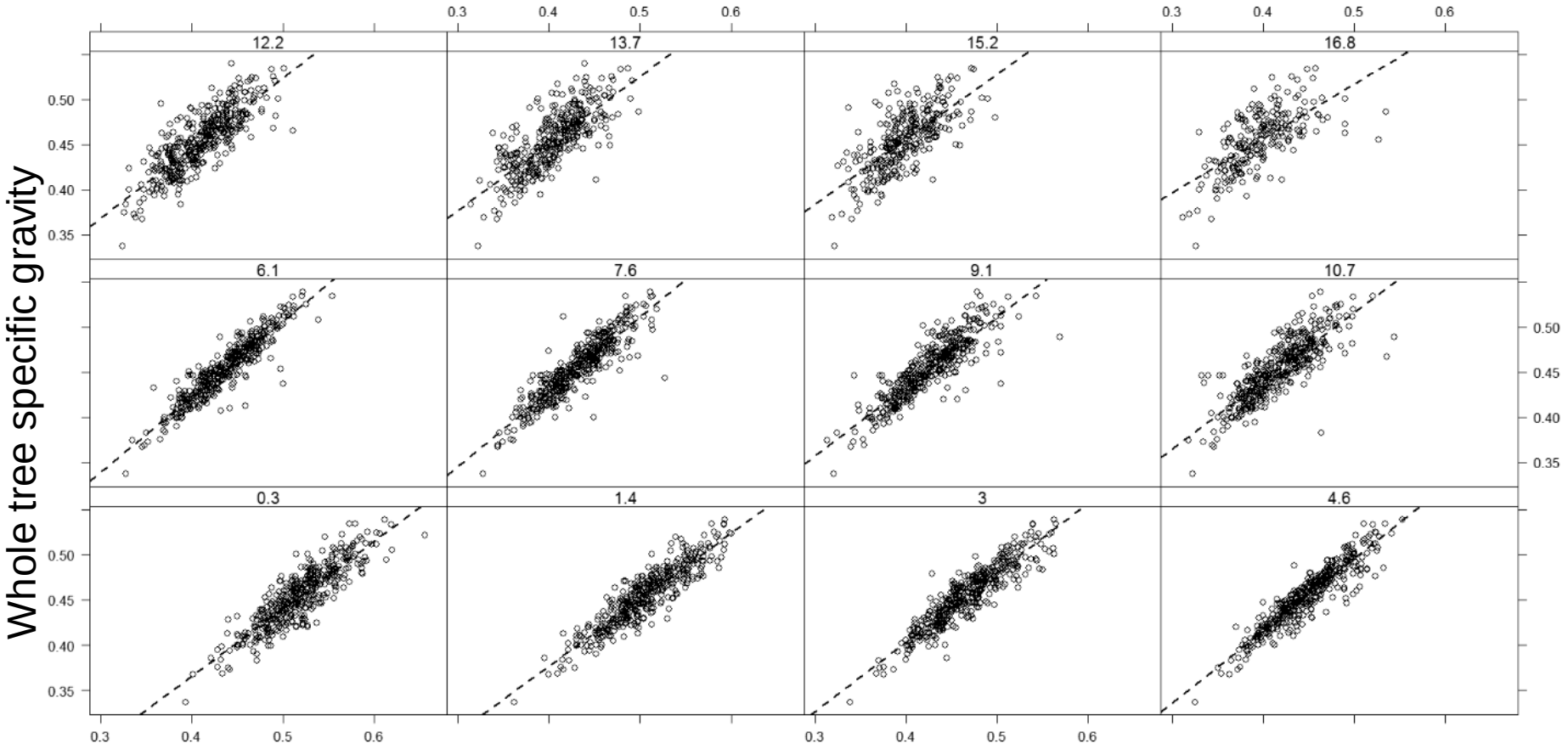


Figure courtesy of Geoff Downes – FWPA Australia

Identification of representative sampling heights for specific gravity and moisture content in plantation-grown loblolly pine (*Pinus taeda*)

Finto Antony, Laurence R. Schimleck, and Richard F. Daniels

Heights in meters

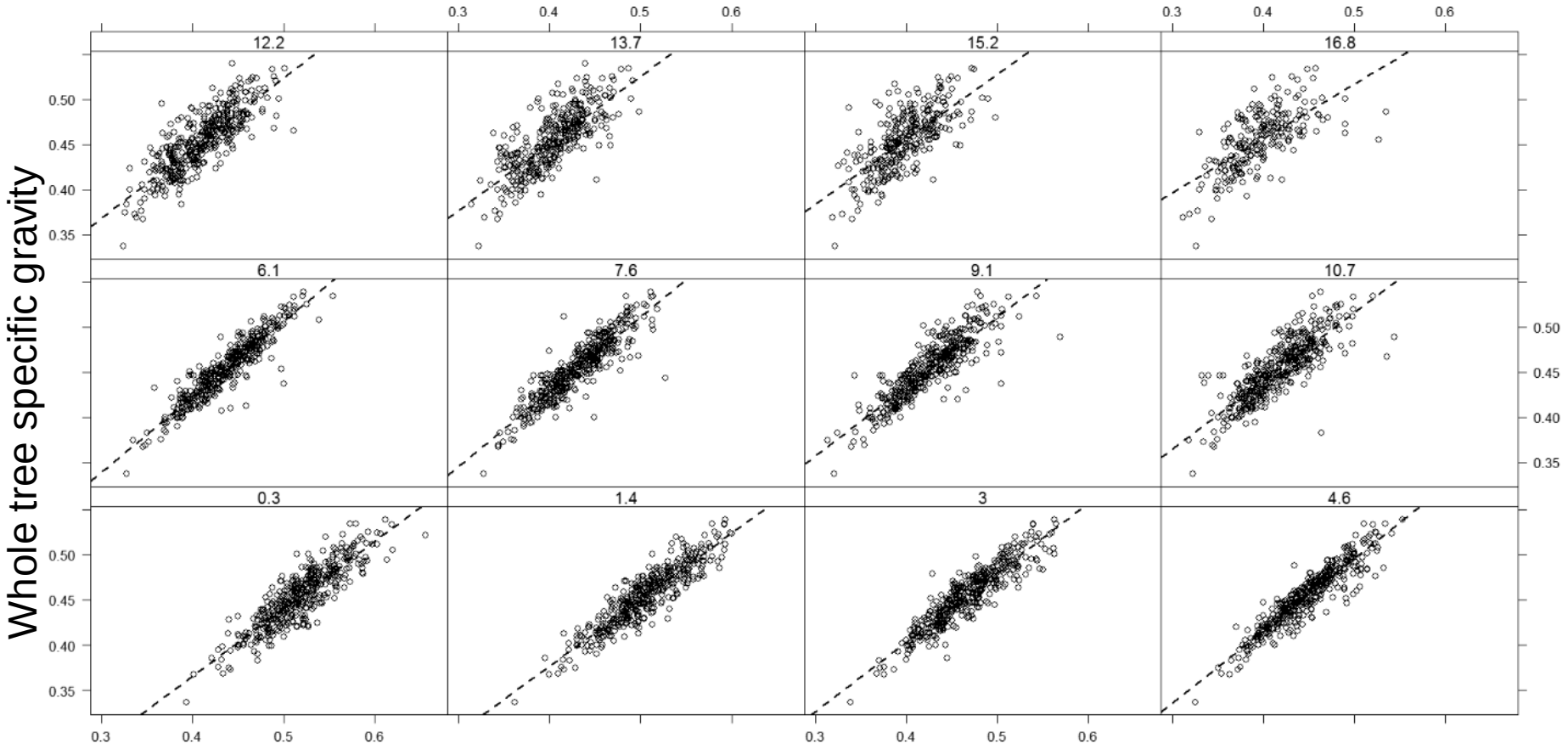


Whole tree specific gravity

Disk specific gravity

Disk specific gravity at DBH has a strong relationship with whole tree specific gravity ($R^2 = 0.81$)

Heights in meters



- Trees will be harvested and measured
- Disks will be collected from harvested trees
- Specific gravity and carbon % will be measured on wood and bark
- Differences by treatment will be quantified

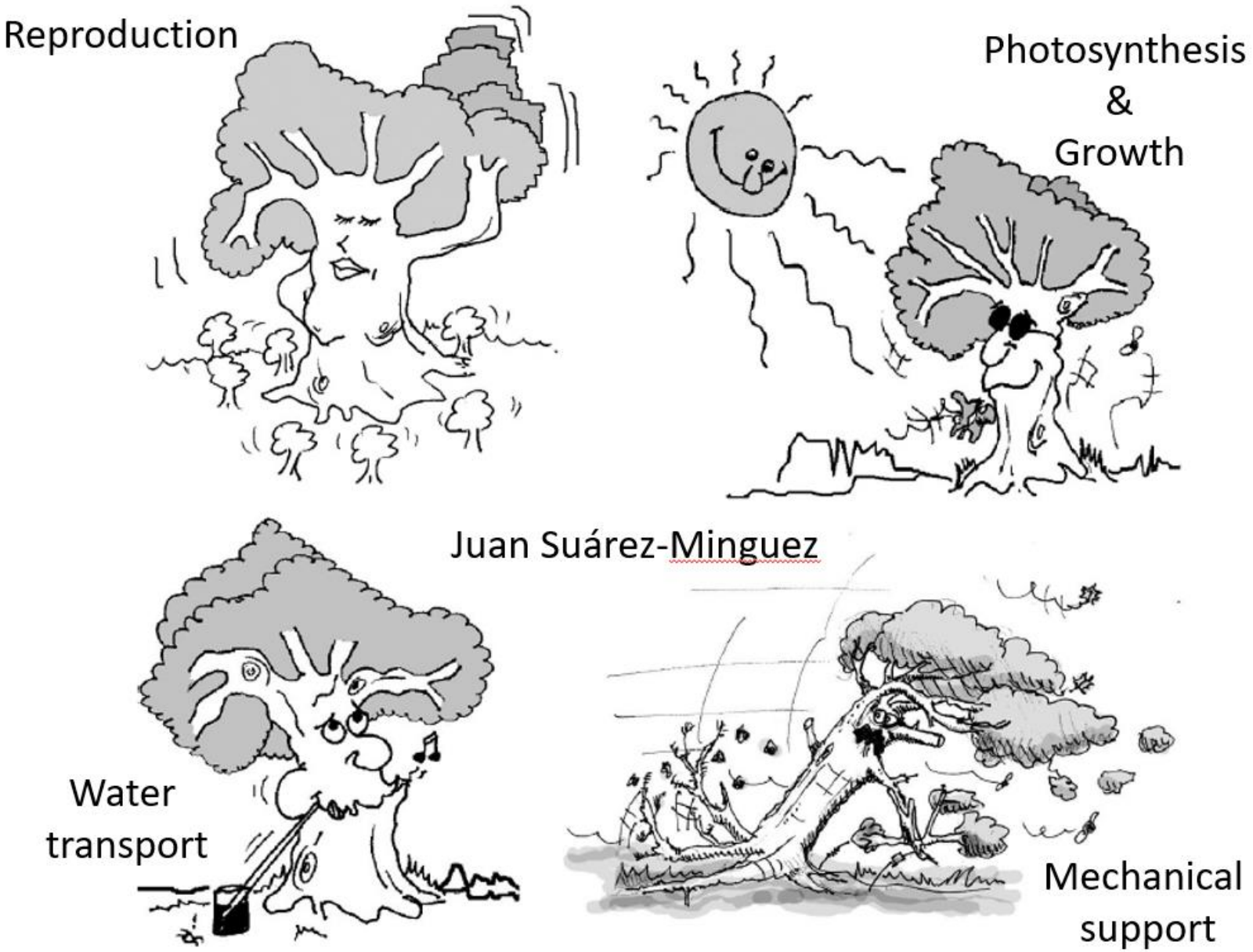
- Models of carbon sequestered by silvicultural treatment

- Preliminary work on a field tool to quantify stand and tree variability

Budget

- The team is working through the budget needed to accomplish this project while considering other funding sources
- As of today the budget requested from CAFS is TBD

Questions?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